After this digression concerning varieties in the structure of the heart, the author resumes his anatomy of the *Squalus maximus*, and notices, among the peculiarities of the urinary passages, that there is no proper urinary bladder, but a cavity comparatively small, that is common to the urine and semen; since both the vasa differentia and ureters open into it at the distance of about four inches from each other.

The holders in the male Squalus have been noticed before; but it is now added, that in each holder is a canal, communicating with a cavity between the skin and muscles of the abdomen, which is stated to be eleven feet long and two wide. The surfaces of this cavity are white, and extremely smooth; and it contains a mucus more viscid than any known animal secretion.

Respecting the brain, it is remarked, that in the Squalus, as well as in fish in general, the cerebrum is wanting, unless the part from which the olfactory nerves arise be so called.

The eye is very small for the size of the fish; its largest diameter being not more than three inches, and its shortest only one inch and three quarters.

The straight muscles that surround the eye are so much stronger than would appear to the author requisite for moving so small a sphere, that he thinks such strength can only be required in adjustment of the eye for overcoming the stiffness of the sclerotic coat.

Some further Observations on a new detonating Substance. In a Letter from Sir Humphry Davy, *LL.D. F.R.S. V.P.R.I. to the Right Hon. Sir* Joseph Banks, *Bart. K.B. P.R.S.* Read July 1, 1813. [*Phil. Trans.* 1813, *p.* 242.]

In a second letter which the author received from France, he is informed that the detonating oil was there originally procured by passing a mixture of chlorine and azote through aqueous solutions of sulphate or muriate of ammonia; but from the method of obtaining it in this country, it is evident that the azote is unnecessary, as it is obtained by exposure of any ammoniacal salt in solution to mere chlorine. The oily fluid obtained by these means has the specific gravity of 1·653. It is not congealed by cold, as the author had formerly supposed, but remains fluid even when cooled by a mixture of ice and muriate of lime.

When kept in water, it gradually disappears, and the water becomes acid, having the taste and smell of weak nitro-muriatic acid.

Concentrated muriatic acid decomposes it, disengaging chlorine, and forming muriate of ammonia.

In concentrated nitric acid it gives out azote.

In dilute sulphuric acid it yields a mixture of azote and oxygen.

In a strong solution of ammonia it detonates; with a weak solution it yields azote.

With the muriates of sulphur and of phosphorus, or with sulphuret of carbon, it combines without any violence.

When it is kept in contact with mercury alone, it yields azote and a white powder, consisting of a mixture of calomel and corrosive sublimate.

One means of estimating the proportion of the elements was obtained from this mode of analysis, and it appeared to be 19 azote to 81 chlorine.

In such attempts as were made to decompose this substance in exhausted vessels, the tendency to explosion was such, that no estimate could be formed of its elements, from the small quantities on which it was safe to operate.

The mode of analysis on which the author places the most reliance, is that performed by means of muriatic acid. According to his view of the play of affinities in this process, ammonia is formed by the union of the azote in the compound with the hydrogen of one part of the muriatic acid, occasioning the chlorine of both to be set free; while the ammonia so formed combines with another portion of the muriatic acid, and is found in the solution as muriate of ammonia. In addition to the quantity of chlorine actually evolved in this mode of trial, it was necessary to estimate the quantity remaining dissolved in the liquid. For this purpose the sulphuric solution of indigo was employed, and the quantity of chlorine estimated by the quantity of blue colour destroyed.

From the results of two experiments, the author infers that nine grains of azote are combined with 91 of chlorine; and since this proportion accords very nearly with the supposition of one volume of azote with four equal volumes of chlorine, he regards the present as a satisfactory instance of the law of definite proportions; for the estimate obtained by the action of mercury upon the oil, differs no more than might be expected from the nature of the experiment.

Since one of azote combines with three of hydrogen to form ammonia, and three of hydrogen combine with three of chlorine in muriatic acid, the author had thought it probable that one of azote would have been found combined with three of chlorine, but is now of opinion that no strict laws of analogy are to be found from which we can form a previous judgement of such combinations; and he takes occasion to remark, that other philosophers who have presumed that azote contains oxygen, are not warranted in their inference by any laws that he has observed.

Experiments on the Production of Cold by the Evaporation of the Sulphuret of Carbon. By Alexander Marcet, *M.D. F.R.S. one of the Physicians to Guy's Hospital.* Read July 8, 1813. [*Phil. Trans.* 1813, *p.* 252.]

In a former paper which the author communicated jointly with Professor Berzelius on sulphuret of carbon, its remarkable volatility was noticed; and as it appeared likely on that account to produce a great degree of cold by evaporation, Dr. Marcet has been induced to make a course of experiments on that subject.